

# First record of the red-mouthed goby, *Gobius cruentatus* (Gobiidae), in the Black Sea

by

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**RÉSUMÉ.** - Premier signalement du gobie ensanglanté *Gobius cruentatus* (Gobiidae) en mer Noire.

Huit gobies ensanglantés, *Gobius cruentatus* Gmelin, 1789, ont été récoltés sur la côte sud-est de la mer Noire. C'est le premier signalement de cette espèce dans la mer Noire, ce qui permet d'apporter des données sur la morphologie et l'écologie de cette espèce en mer Noire.

**Key words.** - Gobiidae - *Gobius cruentatus* - Black Sea - Morphology - Ecology - New records.

*Gobius cruentatus* Gmelin, 1789 is an eastern Atlantic goby, occurring from the southwest Ireland to Senegal and in the Mediterranean (Miller, 1986). It is a common species on the inshore rocky habitats, sand with stones and boulders and on the sea-grass meadows in this area (Miller, 1986). The red-mouthed goby is a frequent and abundant benthic species in its characteristic habitat. The most eastern records of this species were from the Anatolian coast of the Aegean Sea and the Sea of Marmara (Miller, 1986; Bilecenoglu *et al.*, 2002). The present finding at the south-east coast of the Black Sea is the first record for the Black Sea and extends the known distribution area of the species (Fig. 1). The urgency of studies on biological diversity of the Black Sea gobies is determined by the problems of taxonomy and zoogeography of the native gobies and by the problem of the extension of the Mediterranean fauna to the Black Sea or "Mediterraneanization" (Vasil'eva and Bogorodskii, 2004).

## MATERIAL AND METHODS

### Material (Fig. 2)

Eight specimens were collected and deposited in the Zoological

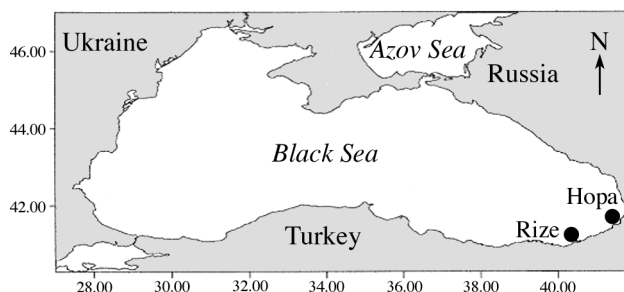


Figure 1 - Map of the Black Sea showing sites of records of *Gobius cruentatus*. [Carte de la mer Noire indiquant les points de capture de *Gobius cruentatus*.]

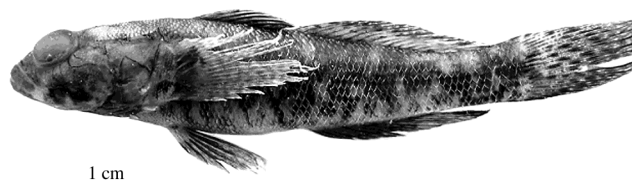


Figure 2 - *Gobius cruentatus*, male, 67.7 + 18.2 mm, FFR 1012, Hopa, Artvin, Türkiye, South Eastern Black Sea coast, 41°24'N, 41°25'E, 14 August 2004.

collection, Faculty of Fisheries Rize (FFR), Karadeniz Technical University. FFR 1011, female, 63.6 + 17.2 mm, Rize, Türkiye, 11 Aug. 2004. - FFR 1012, 1 male, 67.7 + 18.2 mm and 2 females, 72.6 + 18.6 mm and 62.0 + 17.9 mm, Hopa, Artvin, Türkiye, 14 Aug. 2004. - FFR 1013, 2 males, 73.6 + 18.4 mm and 105.4 + 25.3 mm, and 2 females 69.2 + 17.2 mm and 72.8 + 18.5 mm, Cayeli, Rize, Türkiye, 15 Aug. 2004. All specimens were collected by S. Engin and D. Turan. Meristic methods as in Miller (1988). Meristic abbreviations: A, anal fin; C, caudal fin; D1, D2, first and second dorsal fin; P, pectoral fin; V, pelvic disc; LL, scales in lateral series; TR, scales in transverse series. Terminology of lateral-line system follows Sanzo (1911) and Miller (1986).

## RESULTS

### Morphology

The specimens possessed the characters described in Kovačić and Miller (2000), that distinguish the genus *Gobius* from other gobiid genera. The specimens were identified as *G. cruentatus* by the following combination of characters: (1) oculoscapular row  $x^1$  extending forward to pore  $\beta$ ; (2) lips red and body reddish-brown with larger dark blotches along lateral midline; (3) cheek scaled; and (4) number of scales in lateral series 52-56.

The specimens collected are characterized as follows. Anterior nostril short, tubular, with process elongated in tentacle. Fins: D1 VI; D2 I/13-I/14; A I/11+I/12; C 16-17 articulated rays, 14-15 branched; P 20-21. P with ends of three to four uppermost rays free from membrane. V slightly emarginated; anterior membrane height in midline about 1/2 to 3/4 length of pelvic spinous ray. C rounded. Body covered with ctenoid scales. Breast, abdomen, predorsal area, opercle and cheek scaled. Scales LL 52-56, TR 14-16. In life coloration of body reddish-brown and lips red. Preserved specimens dark brown: five dark blotches along lateral midline, longer than deep. Upper part of body dark brown with fawn saddles above midline blotches. Underside mottled. Head similar to body. Head sensory papillae black. D1 dark brown. D2, C, A, P and V dark brown

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in larger specimens to fawn with brown spots in smaller specimens. Head with anterior and posterior oculoscapular, and preopercular canals, with pores  $\sigma$ ,  $\lambda$ ,  $\kappa$ ,  $\omega$ ,  $\alpha$ ,  $\beta$ ,  $\rho$ ,  $\rho^l$ ,  $\rho^2$ , and  $\gamma$ ,  $\delta$ ,  $\varepsilon$  respectively. Rows and, in parenthesis, number of sensory papillae as follows: (1) preorbital: snout with five median preorbital series, row  $r$  divisible into two sections, superior inner  $r^l$  (7-8) and inferior outer  $r^2$  (6-7), row  $s^l$  (4-5) below pore  $\sigma$ ,  $s^2$  (7-11) and  $s^3$  (8-12) more medially. Lateral series  $c$  in three parts: superior  $c^2$  (8-12) in two horizontal rows; middle  $c^l$  (14-18) with upper and lower sections; inferior upper  $c_1$  (11-15) and lower  $c_2$  (5-8). (2) suborbital: six transverse suborbital rows (1-6) of sensory papillae, rows 2 and 3 begin near orbit, inferior sections of row 5 and 6 well developed. (1: 18-22, 2: 11-16, 3: 12-16, 4: 11-18, 5s: 8-11, 5i: 7-10, 6s: 9-13, 6i: 12-17). Longitudinal row  $b$  (22-27) extending forward through row 5. Longitudinal row  $d$  continuous (38-45). Supralabial and horizontal part of row  $d$  overlapped. (3) preoperculo-mandibular: external row  $e$  and internal row  $i$  divided into anterior ( $e$ : 39-45,  $i$ : 25-28), and posterior sections ( $e$ : 38-42,  $i$ : 26-32); row  $f$  (5-8). (4) oculoscapular: anterior longitudinal row  $x^l$  (20-25) extending forward to pore  $\beta$ , posterior longitudinal row  $x^2$  (9-11) above  $\rho^2$ ; row  $z$  (7-11) with lower end at pore  $\gamma$ , row  $q$  (3-7) between pores  $\rho$  and  $\rho^l$ , row  $y$  (5-10) behind pore  $\rho^2$ . Axillary rows  $as^l$  (10-15),  $as^2$  (11-15),  $as^3$  (18-20),  $la^l$  (3-6) and  $la^2$  (4-5) well developed. (5) opercular: transverse row  $ot$  (32-40); superior longitudinal row  $os$  (17-27); and inferior longitudinal row  $oi$  (11-22). (6) anterior dorsal: anterior transverse row  $n$  (9-12) behind pore  $\omega$ , row  $g$  (13-20) ending behind lateral part of row  $o$ , row  $o$  (15-20) separated from fellow in dorsal midline, row  $m$  (9-12), row  $h$  (23-27).

### Ecological and geographical distribution

The specimens were sampled at 1.7-5.1 m depth, with hand-net and spear-gun during skin diving and scuba diving. The collected specimens, as well as those observed during the fieldwork, were present at the rocky bottom, usually at the sheltered sides of breakwaters. The species was numerous and frequent on the researched sites. The collecting sites were situated along the south-east coast of the Black Sea at Rize and Hopa (Fig. 1).

### DISCUSSION

Until now, five *Gobius* species have been recorded from the Black Sea: *G. buccichi* Steindachner, 1870, *G. cobitis* Pallas, 1814, *G. niger* Linnaeus, 1758, *G. paganellus* Linnaeus, 1758, *G. xanthocephalus* Heymer & Zander, 1992 (Miller 1986; Bilecenoglu *et al.*, 2002; Vasil'eva and Bogorodskii, 2004). All these species are, more or less, widespread from the eastern Atlantic throughout the Mediterranean and they are fairly continuous within their range, as *G. cruentatus* (Miller, 1986; Heymer and Zander, 1992; Almeida and Arruda, 1998). The five *Gobius* species previously known for the Black Sea are considered native species of this basin (Miller, 1986; Vasil'eva and Bogorodskii, 2004). Is the late finding of a relatively large goby such as *G. cruentatus* the result of its recent introduction into the basin or does this reflect inadequate knowledge of the native Black Sea gobies? During the last decade the use of diving techniques has improved the knowledge of geographical range and diversity of gobies in some sectors of the Mediterranean Sea, including the description of a relatively large *Gobius* species in the relatively well studied Adriatic Sea (*Gobius kolombatovici* Kovačić & Miller, 2000). *G. cruentatus* has now been to be found frequent and abundant on the collecting sites. The collecting site is far to the east of the Black Sea, at the location opposite to the Bosphorus. All

the first findings of the eastern Atlantic gobies in the Mediterranean or the Mediterranean gobies in the eastern Atlantic have been considered as new records of native species and not the species introduction. The only introductions of marine gobies in the area beyond any doubt are those of lessepsian migrants in the Mediterranean (Golani *et al.*, 2002). The range of these gobies in the Mediterranean, as well as of other small epibenthic lessepsian fishes, is restricted to the Mediterranean entrance to the Suez Canal and the Levantine coasts. The first findings of other non-native Mediterranean fishes recorded far from the entrances (the Strait of Gibraltar or the Suez Canal) are limited to individual specimens, and do not refer to well established populations (Golani *et al.*, 2002). Considering the presented data, we believe that *G. cruentatus* is native to the Black Sea, not a recent immigrant. Future research using more advanced diving techniques will significantly change knowledge of the diversity of native gobiid fishes of this basin.

The present sample differs from the described characters of *G. cruentatus* (Miller, 1986) in range of D2 and A meristics. To identify possible differences between Black Sea population and populations from other regions, the comparison of characters from representative samples is needed. However, there is no detailed morphological description of an adult representative sample of this well-known species.

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